

**DEPARTMENT OF CIVIL ENGINEERING  
GANAPATI INSTITUTE OF ENGINEERING AND TECHNOLOGY,  
JAGATPUR, CUTTACK**

**LESSON PLAN OF 4<sup>TH</sup> SEMESTER(2023-24) CIVIL ENGINEERING**

DISCIPLINE- CIVIL ENGG.	SEMESTER-4 <sup>TH</sup>	NAME OF THE TEACHING FACULTY-JAYALAXMI BEHERA
SUBJECT- LAND SURVEY-I (Th3)	NO. OF DAYS PER WEEK CLASS ALLOTTED-03/05	SEMESTER FROM DATE-16/01/24 TO DATE-26/04/24 NO. OF WEEKS-15
WEEK	CLASS DAY	THEORY TOPICS
1 <sup>ST</sup>	1 <sup>ST</sup>	<b>INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS:</b> 1.1 Surveying: Definition, Aims and objectives
	2 <sup>ND</sup>	1.2 Principles of survey-Plane surveying- Geodetic Surveying- Instrumental surveying.
	3 <sup>RD</sup>	1.3 Precision and accuracy of measurements, instruments used for measurement of distance
2 <sup>ND</sup>	1 <sup>ST</sup>	Types of tapes and chains.
	2 <sup>ND</sup>	1.4 Errors and mistakes in linear measurement – classification, Sources of errors and remedies.
	3 <sup>RD</sup>	1.5 Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections.
3 <sup>RD</sup>	1 <sup>ST</sup>	<b>CHAINING AND CHAIN SURVEYING :</b> 2.1 Equipment and accessories for chaining 2.2 Ranging – Purpose, signaling, direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging.
	2 <sup>ND</sup>	2.3 Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction.
	3 <sup>RD</sup>	2.4 Setting perpendicular with chain & tape, Chaining across different types of obstacles –Numerical problems on chaining across obstacles.
4 <sup>TH</sup>	1 <sup>ST</sup>	2.5 Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines.
	2 <sup>ND</sup>	2.7 Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square.
	3 <sup>RD</sup>	2.8 Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying.

5 <sup>TH</sup>	1 <sup>st</sup>	<b>ANGULAR MEASUREMENT AND COMPAS SURVEYING :</b> 3.1 Measurement of angles with chain, tape & compass 3.2 Compass – Types, features, parts, merits & demerits, testing & adjustment of compass
	2 <sup>nd</sup>	3.3 Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of application, numerical problems on conversion of bearings
	3 <sup>rd</sup>	3.4 Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from bearings.
6 <sup>TH</sup>	1 <sup>st</sup>	3.5 Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination.
	2 <sup>nd</sup>	3.6 Errors in angle measurement with compass – sources & remedies. 3.7 Principles of traversing – open & closed traverse, Methods of traversing.
	3 <sup>rd</sup>	3.8 Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction.
7 <sup>TH</sup>	1 <sup>st</sup>	3.9 Errors in compass surveying – sources & remedies.  Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table
	2 <sup>nd</sup>	<b>MAP READING CADASTRAL MAPS &amp; NOMENCLATURE:</b> 4.1 Study of direction, Scale, Grid Reference and Grid Square Study of Signs and Symbols
	3 <sup>rd</sup>	4.2 Cadastral Map Preparation Methodology 4.3 Unique identification number of parcel
8 <sup>TH</sup>	1 <sup>st</sup>	4.4 Positions of existing Control Points and its types
	2 <sup>nd</sup>	4.5 Adjacent Boundaries and Features, Topology Creation and verification.
	3 <sup>rd</sup>	<b>PLANE TABLE SURVEYING :</b> 5.1 Objectives, principles and use of plane table surveying. 5.2 Instruments & accessories used in plane table surveying.
9 <sup>TH</sup>	1 <sup>st</sup>	5.3 Methods of plane table surveying – (1) Radiation, (2) Intersection, (3) Traversing, (4) Resection.
	2 <sup>nd</sup>	5.4 Statements of TWO POINT and THREE POINT PROBLEM. Errors in plane table surveying and their corrections, precautions in plane table surveying.



	3 <sup>rd</sup>	<b>THEODOLITE SURVEYING AND TRAVERSING:</b> 6.1 Purpose and definition of theodolite surveying 6.2 Transit theodolite- Description of features,
10 <sup>TH</sup>	1 <sup>st</sup>	component parts, Fundamental axes of a theodolite, concept of vernier, reading a vernier, Temporary adjustment of theodolite
	2 <sup>nd</sup>	6.3 Concept of transiting –Measurement of horizontal and vertical angles.
	3 <sup>rd</sup>	6.4 Measurement of magnetic bearings, deflection angle, direct angle, setting out angles, prolonging a straight line with theodolite, Errors in Theodolite observations
11 <sup>TH</sup>	1 <sup>st</sup>	6.5 Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method, Plotting the traverse by coordinate method, Checks for open and closed traverse.
	2 <sup>nd</sup>	6.6 Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table, Numerical problems on omitted measurement of lengths & bearings
	3 <sup>rd</sup>	6.7 Closing error – adjustment of angular errors, adjustment of bearings, numerical problems 6.8 Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.
12 <sup>TH</sup>	1 <sup>st</sup>	<b>LEVELLING AND CONTOURING :</b> 7.1 Definition and Purpose and types of leveling– concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.
	2 <sup>nd</sup>	7.2 Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis. 7.3 Levelling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.
	3 <sup>rd</sup>	7.5 Effects of curvature and refraction, numerical problems on application of correction. 7.6 Reciprocal leveling – principles, methods, numerical problems, precise leveling.
13 <sup>TH</sup>	1 <sup>st</sup>	7.7 Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.
	2 <sup>nd</sup>	7.8 Definitions, concepts and characteristics of contours. 7.9 Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets.
	3 <sup>rd</sup>	7.10 Use of contour maps on civil engineering projects – drawing cross-sections from contour maps, locating proposal routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure.

14 <sup>TH</sup>	1 <sup>ST</sup>	7.11 Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making
	2 <sup>ND</sup>	<b>COMPUTATION OF AREA &amp; VOLUME:</b> 8.1 Determination of areas, computation of areas from plans.
	3 <sup>RD</sup>	8.2 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule.
15 <sup>TH</sup>	1 <sup>ST</sup>	8.3 Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes.

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